a) measuring a voltage drop across at least a portion of a conductor having a definite resistance and connecting said power line with said motor control circuit;

b) calculating said current drawer from said voltage dropping; and

c) with a microcomputer forming part of the motor control circuit, effecting a regulatory action for said pump as a function of temperature.

REMARKS

The present amendment is submitted in an earnest effort to advance this case to issue without delay.

1. Applicant hereby reiterates his claim to the priority of his German application of 4 September 1998 under the International Convention. A certified copy of the German application has been placed of record in the file and hence Applicant has complied fully with all of the requirements for perfecting priority.

An acknowledgement of the priority claim and compliance with priority requirements is requested.

2. The specification has been corrected in minor respects, especially to provide antecedent basis, and a revised specification page is enclosed together with a marked up copy showing the changes made. The revised specification does not

contain any new matter and hence substitution of the pages enclosed for those originally provided is requested.

Similarly, the claims have been amended as to form and a new claim 12 has been added. Marked up copies of corrected claims are enclosed as well.

3. Claims 1 to 11 have been amended to clarify some of the issues raised by the Examiner and a new claim 12 has been added, particularly directed to the feature of FIG. 5 and thus claims 1 to 12 are now in the case.

Claims 1 to 11 were rejected under 35 USC 112, first paragraph, as containing subject matter which was allegedly not described in such manner as to enable one skilled in the art to which it pertains to make and/or use in the invention. In particular, it refers to details as to how the apparatus of FIG. 4 operates with respect to compensation of temperature.

However, the description of FIG. 4 makes quite clear that the microprocessor or processing unit responds to temperature and thus prevents overload of the motor, e.g. by cutting it off and as a consequence initiates an action based upon temperature and which can be considered a compensation for the increase in temperature to the extent that the system shuts down and cools off.

Since the ordinary skilled worker in the art can make and practice that concept from the original disclosure, the original disclosure is entirely adequate and enabling with respect to the processing unit and further amplification of the specification is not required.

4. Claims 1 to 11 have been rejected under 35 USC 112, second paragraph on grounds which are not fully understood since Applicant is uncertain by what the Examiner appears to find unclear in the claims. A power line is a line which supplies with power as the specification makes clear. The Examiner asks whether "a power line" is shown in the drawing and at page 8, line 18, the power line 31 is expressly described. The Examiner asks whether the motor control circuit is shown in the drawing and that is shown at 8 (page 7, lines 12 and 13).

Indeed, it would appear that each of the elements specifically questioned by the Examiner has been described in the specification and called out with a reference numeral and shown in the drawing.

Whether a motor control circuit is part of a motor or part of a pump or part of a pump assembly or something else is all a matter of choice. When one purchases a pump for industrial purposes, for example, one obtains not only an impeller and a housing but also the motor best suited for driving it, the motor controls etc., the entire unit being a pump or pump set.

The Examiner has asked whether the computing unit is shown in the drawing and the computing unit is clearly identified at 37 in FIG. 4 and is described variously as a processor, microprocessor, microcomputer or processing unit. The electrical motor of claim 6 is shown at 32. Thus every element questioned by the Examiner is clearly defined.

There is no basis for the rejection of claims under the second paragraph of 35 USC 112.

5. The inventive idea here is to use a portion of the existing conductor between the control circuit and the main power connection for measuring the actual current. For this purpose it is important to know the resistance of the length across which the voltage is tapped. It is thus vital that this length have a definite resistance.

The Examiner has applied **Dowling** presumably because this reference has a power source 32 with conductors 34a, 34b etc. which can be called power lines.

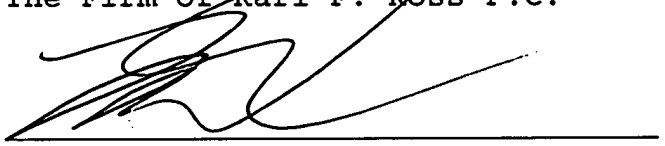
The current in these lines is measured by probes 42, 44 and 46. However, there is no teaching here that a voltage drop is measured "across at least a portion of a conductor having a definite resistance" and indeed the probes 42 etc. appear to be current transformers since they convert current to a voltage signal and do not measure themselves a voltage drop (see col. 5, lines 16ff).

In other words, as the present application makes clear, an existing line is utilized in place of the special sensors hitherto required by simply tapping a power line with a known resistance in that is not disclosed in **Dowling**. Nor is it disclosed in **Hendrix et al** which has also been applied by the Examiner member 24 is a current transformer, i.e. a loop

inductively picking up a signal from the line. A voltage is not tapped from the line which is sensed by the loop.

Neither patent applied by the Examiner anticipates claim 1 or claim 6 and since this feature is not suggested anywhere in the art of record, claims 1 to 11 must be deemed to be allowable. Claim 12 deals with subject matter not rejected on art and, while it is allowable for the reasons set forth above, it certainly must be considered allowable in its present form. Favorable reconsideration is urged.

Respectfully submitted,
The Firm of Karl F. Ross P.C.



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The embodiment of FIG. 2 shows a section through the terminal box 6 which has a foot 9 mounting it to the motor housing. In the box 9 the printed circuit board 10 carries the motor control circuit and a plug contact 11 is provided in the power circuit running to the winding of the motor 4. Between the plug contact 11 and the terminal 12 of the printed circuit board 10, a wire segment 13 is provided with a bonded wire. The bonded wire 13 has in this case a resistance of 2-3 mΩ and is used for the current measurement.

The principle of the invention is shown in FIG. 3 where a power connector 14 has a power conductor or power line 16 running to the power electronics or motor control circuit 7 of the motor and a conductor segment 17a bridges the power section and the motor-control section 8. The segment 17a is connected via a line 17 supplying the motor-control circuit. The measurement resistance is here the segment 17a shown in broken lines.

More particularly, the power source can be seen with a line current 30 in FIG. 4 and can have a power line 31 connected to the power electronic motor control circuitry shown in heavy lines in FIG. 4 and thus to the motor 32 driving the pump 33 and, in particular, to the motor windings. The power circuitry can include the rectifiers 34 forming a standard bridge and a thyristor 35 controlling the motor operation and connected via a resistor 36 to one side of the power line. A microcomputer, processor or computer unit 37 is bridged across the segment 38 of the conductor supplying the motor control circuitry 39 to detect the voltage drop thereacross and

4. The method defined in claim 1 wherein a current measured in said portion of said conductor is converted into a current draw of said pump.

5. The method defined in claim 1 wherein in calculating said current draw from said voltage drop, a computer unit forming part of said motor control circuit effects a regulatory action in response to a temperature of said portion of said conductor.

6. An electronically controlled pump assembly comprising:

an electric motor having a power line connected thereto for energizing said electric motor;

a motor control circuit connected to said motor and said power line for electronically controlling said pump assembly;

a pump driven by said motor; and

means for measuring a voltage drop across at least a portion of a conductor having a definite resistance and connecting said power line with said motor control circuit and calculating said current draw from said voltage drop.

7. The assembly defined in claim 6 wherein said portion of said conductor is a piece of resistance wire with a known specific resistance and a defined length.

8. The assembly defined in claim 6 wherein said portion of said conductor is a bridge between a plug contact to which said power line is connected and a printed circuit board carrying said motor control circuit, said bridge having a defined resistance.

9. The assembly defined in claim 6 wherein said resistance is between 1 and 5 mΩ.

10. The assembly defined in claim 6, further comprising a processor forming part of said motor control circuit and constituting the means for measuring and calculating.

11. The assembly defined in claim 10 wherein said processor is provided to effect a regulatory action in response to the temperature of said portion of said conductor.

4. The method defined in claim 1 wherein a current measured in said portion of said conductor is converted into a current draw of said pump.

5. The method defined in claim 1 wherein in calculating said current draw from said voltage drop, a computer unit forming part of said motor control circuit ~~compensates for a~~ effects a regulating action in response to temperature of said portion of said conductor.

6. An electronically controlled Pump ~~Assembly~~ beam ~~especially~~ comprising:

an electric motor having a power line connected thereto for energizing said electric motor;

a motor control circuit connected to said motor and said power line for electronically controlling said pump assembly;

a pump driven by said motor; and

means for measuring a voltage drop across at least a portion of a conductor having a definite resistance and connecting said power line with said motor control circuit and calculating said current draw from said voltage drop.

7. The assembly defined in claim 6 wherein said portion of said conductor is a piece of resistance wire with a known specific resistance and a defined length.

8. The assembly defined in claim 6 wherein said portion of said conductor is a bridge between a plug contact to which said power line is connected and a printed circuit board carrying said motor control circuit, said bridge having a defined resistance.

9. The assembly defined in claim 6 wherein said resistance is between 1 and 5 mΩ.

10. The assembly defined in claim 6, further comprising a processor forming part of said motor control circuit and constituting the means for measuring and calculating.

11. The assembly defined in claim 10 wherein said processor is provided to ~~(compensate for)~~ effect a regulatory action in response to the temperature of said portion of said conductor.

The embodiment of FIG. 2 shows a section through the terminal box 6 which has a foot 9 mounting it to the motor housing. In the box 9 the printed circuit board 10 carries the motor control circuit and a plug contact 11 is provided in the power circuit running to the winding of the motor 4. Between the plug contact 11 and the terminal 12 of the printed circuit board 10, a wire segment 13 is provided with a bonded wire. The bonded wire 13 has in this case a resistance of 2-3 mΩ and is used for the current measurement.

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More particularly, the power source can be seen with a line current 30 in FIG. 4 and can have a power line 31 connected to the power electronic circuitry shown in heavy lines in FIG. 4 and thus to the motor 32 driving the pump 33 and, in particular, to the motor windings. The power circuitry can include the rectifiers 34 forming a standard bridge and a thyristor 35 controlling the motor operation and connected via a resistor 36 to one side of the power line. A microcomputer 37 is bridged across th segment 38 of the conductor supplying th motor control circuitry 39 to detect the voltage drop ther across and